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Hawkins

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(54) **HYDRAULIC PRESS**

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(51) **Int. Cl.**[7] **B30B 1/32**
(52) **U.S. Cl.** **100/269.17**; 72/455; 100/257; 29/251
(58) **Field of Search** 72/447, 455; 29/251; 100/214, 226, 247, 257, 269.17

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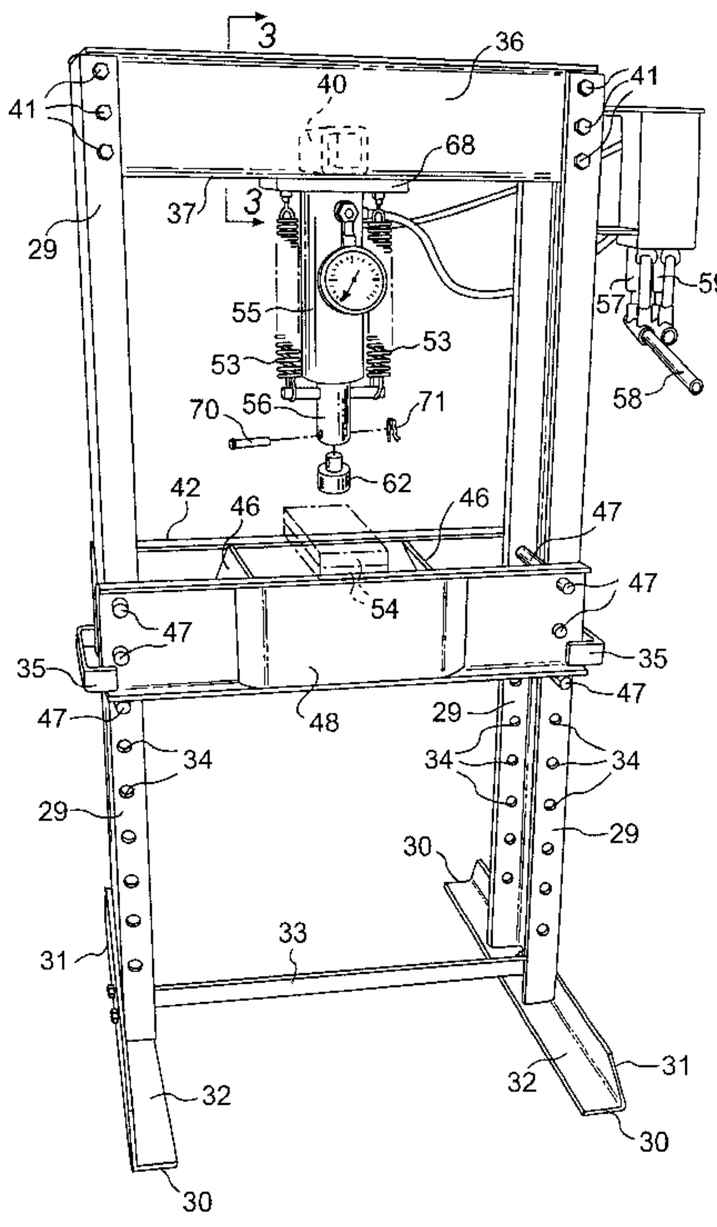
(57) **ABSTRACT**

An hydraulic press includes a head member removably connected at each opposite end to a leg and formed of a unitary sheet of steel rolled into a generally U-shaped transverse cross-section. The head member includes a reinforcing tube at its mid portion. The press includes a bed supported by the legs and disposed beneath the head member. The bed is reinforced at its mid portion by a pair of diagonally disposed spacer plates in the interior of the bed and at the exterior of the bed by a breast plate permanently attached to the front panel and a back plate permanently attached to the rear panel of the bed. At least one additional hole is provided and bored transversely through each end of the bed and positioned so as to correspond to and align with the holes in each leg that receive the pins that support the bed. The pressing force can be provided by an hydraulic jack that can be attached to the head member or to a carriage that is slidably disposed between the head member and the bed.

12 Claims, 7 Drawing Sheets



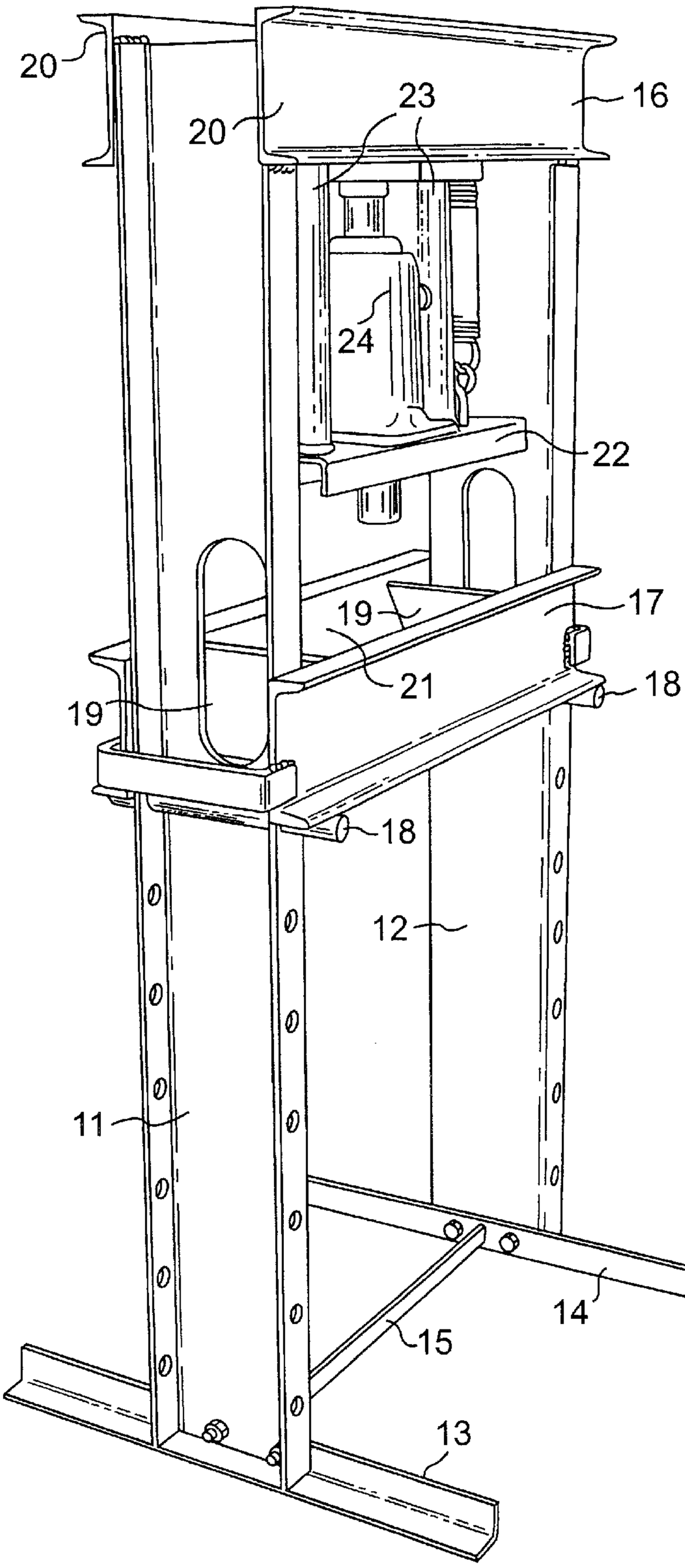


FIG. 1
PRIOR ART

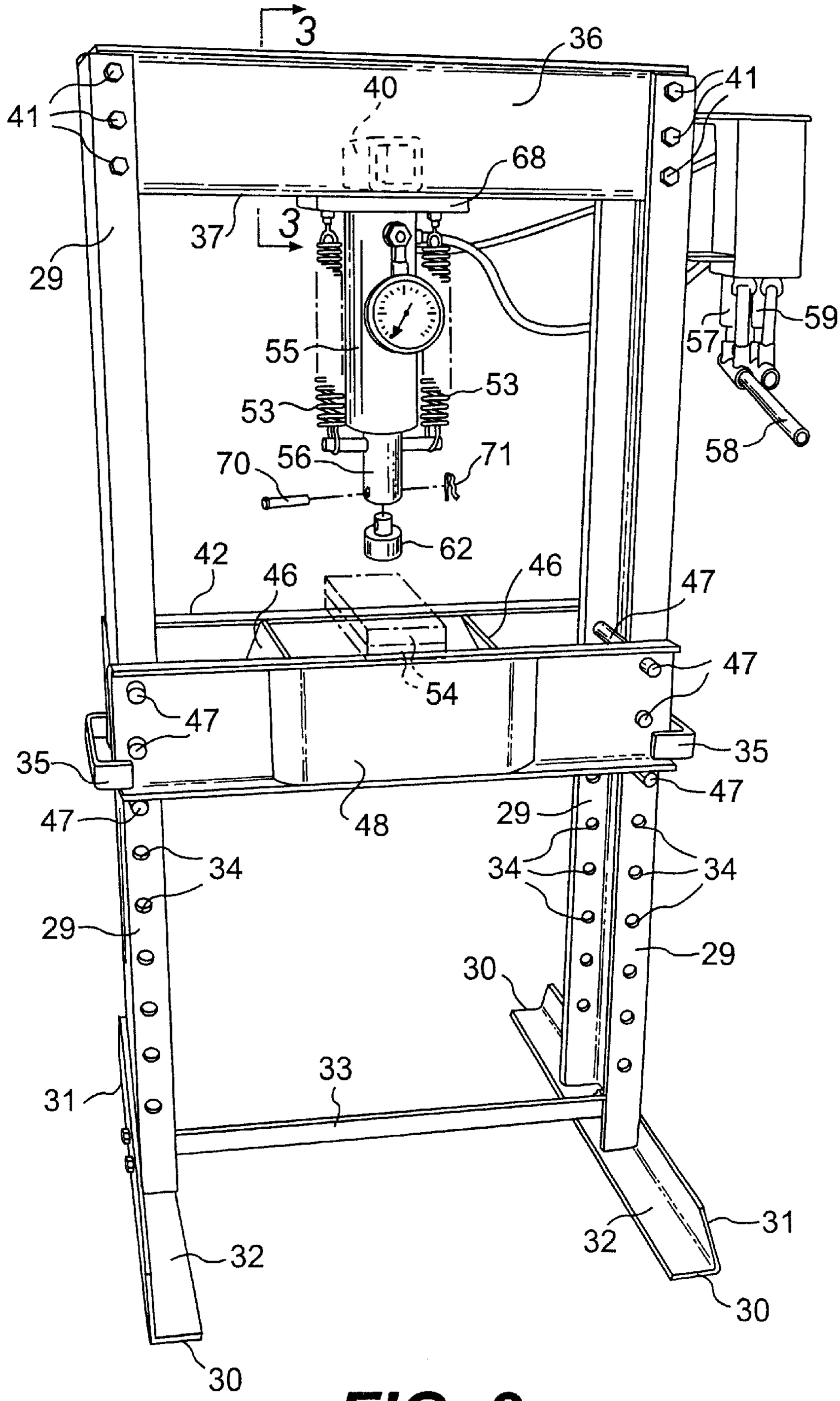

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FIG. 2

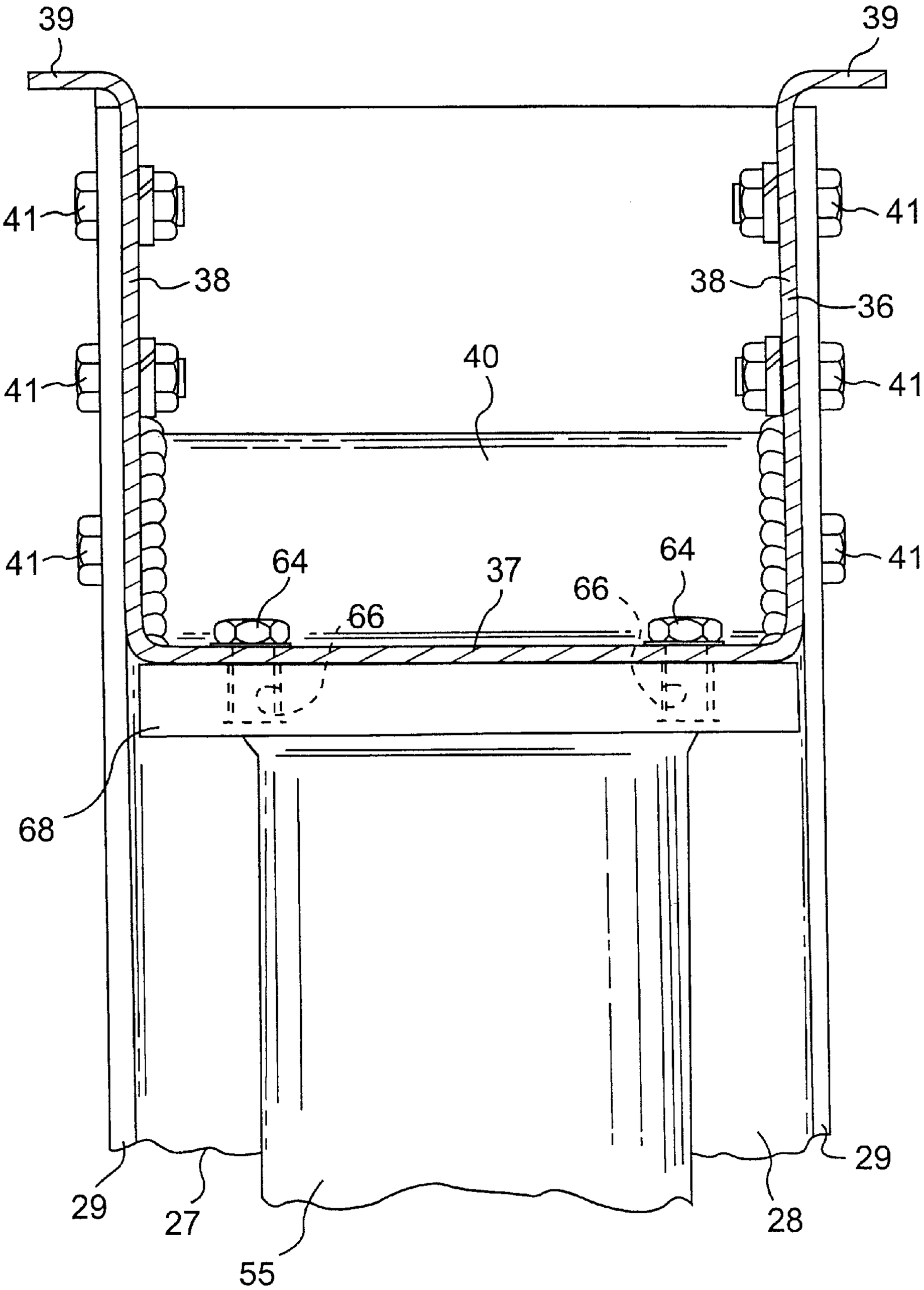

FIG. 3

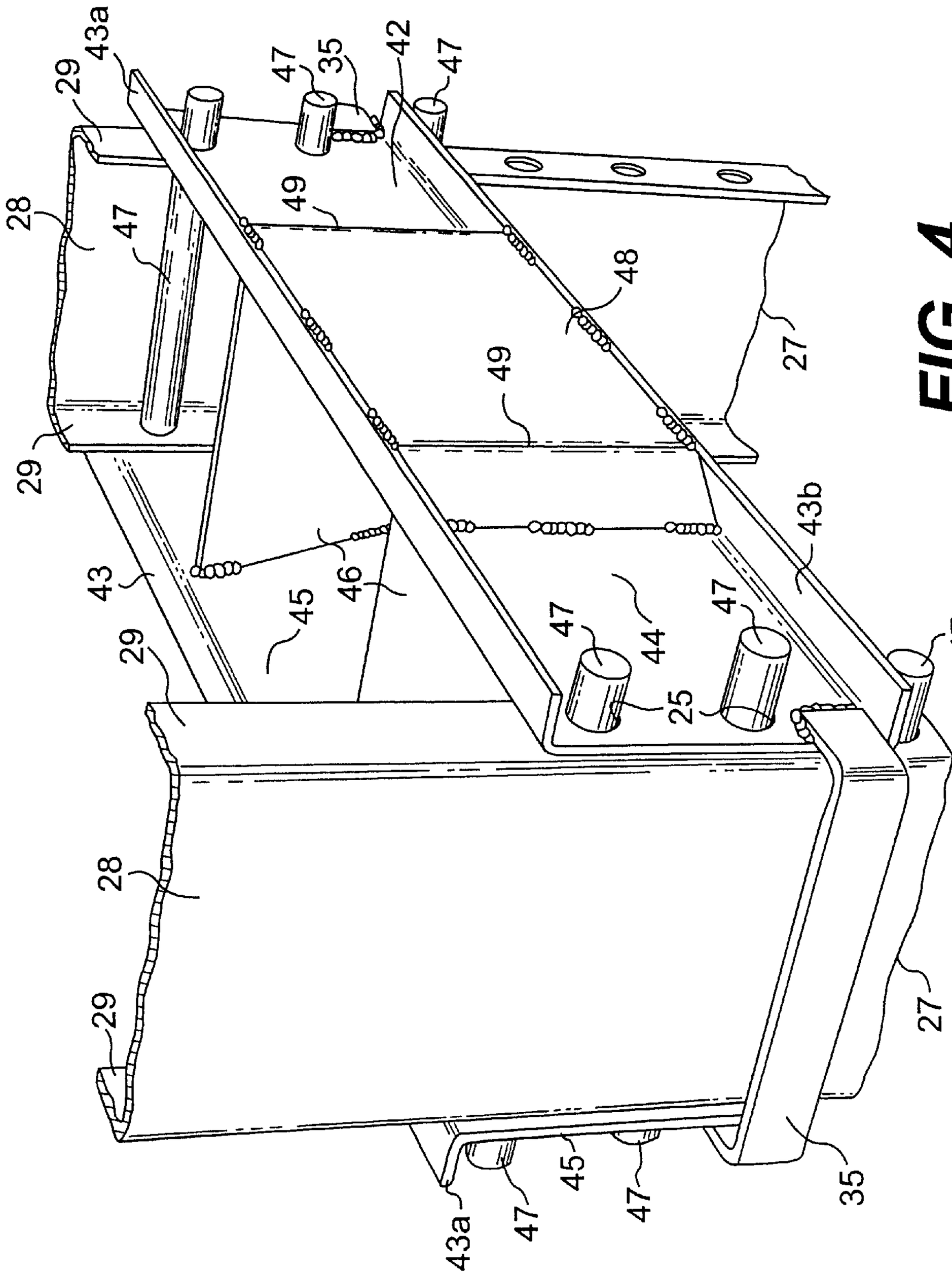
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FIG. 4

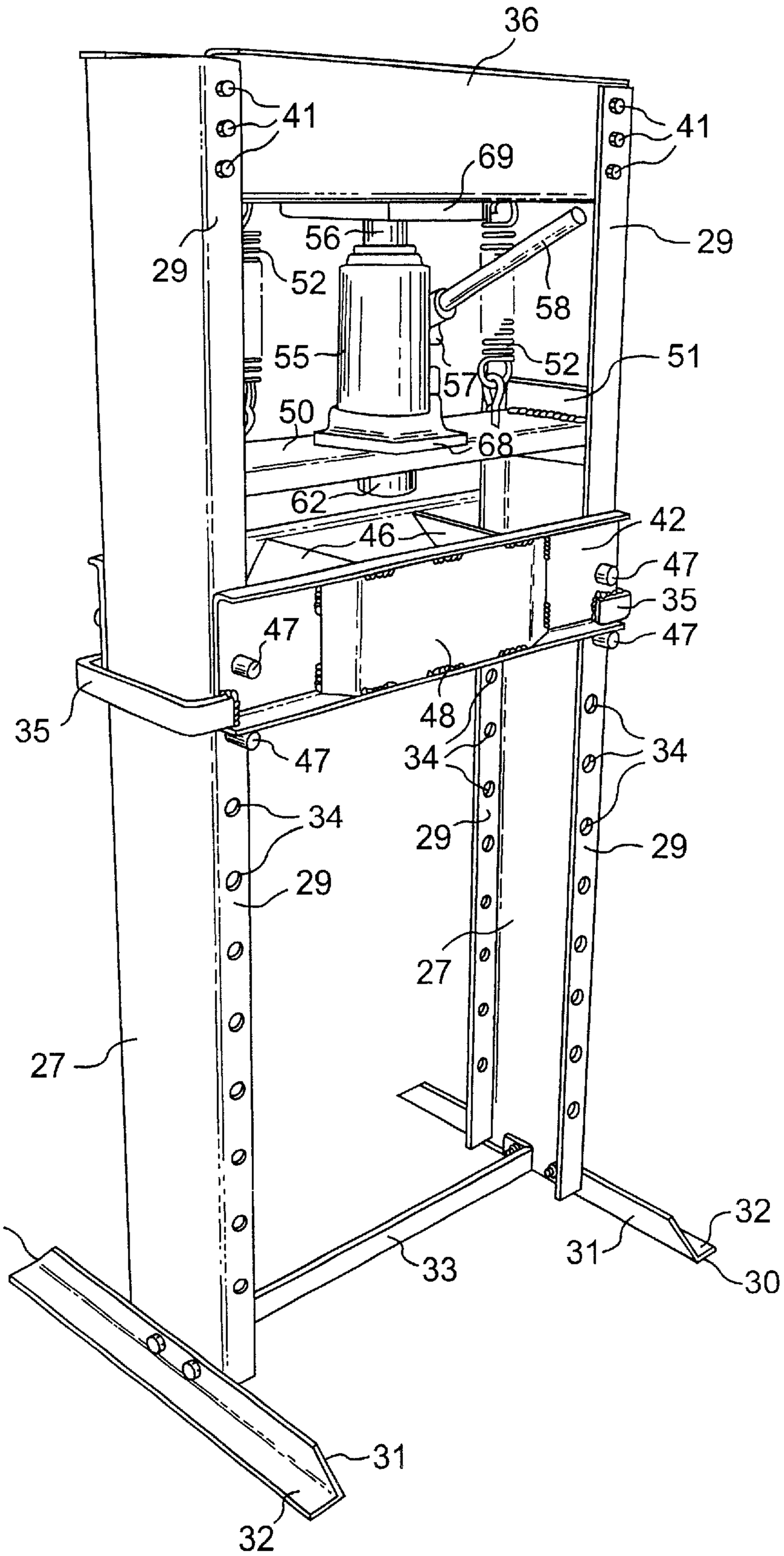
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FIG. 5

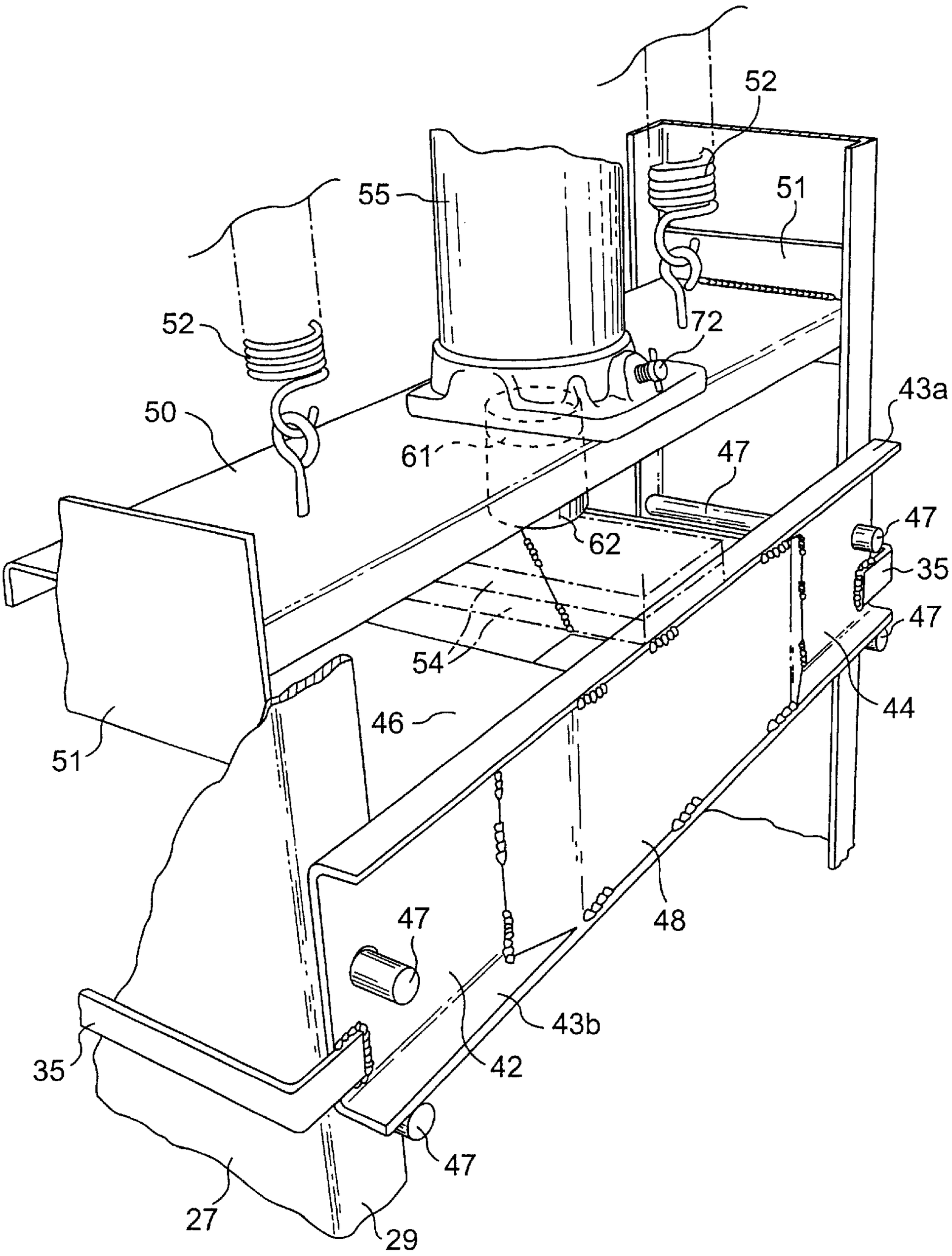
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FIG. 6

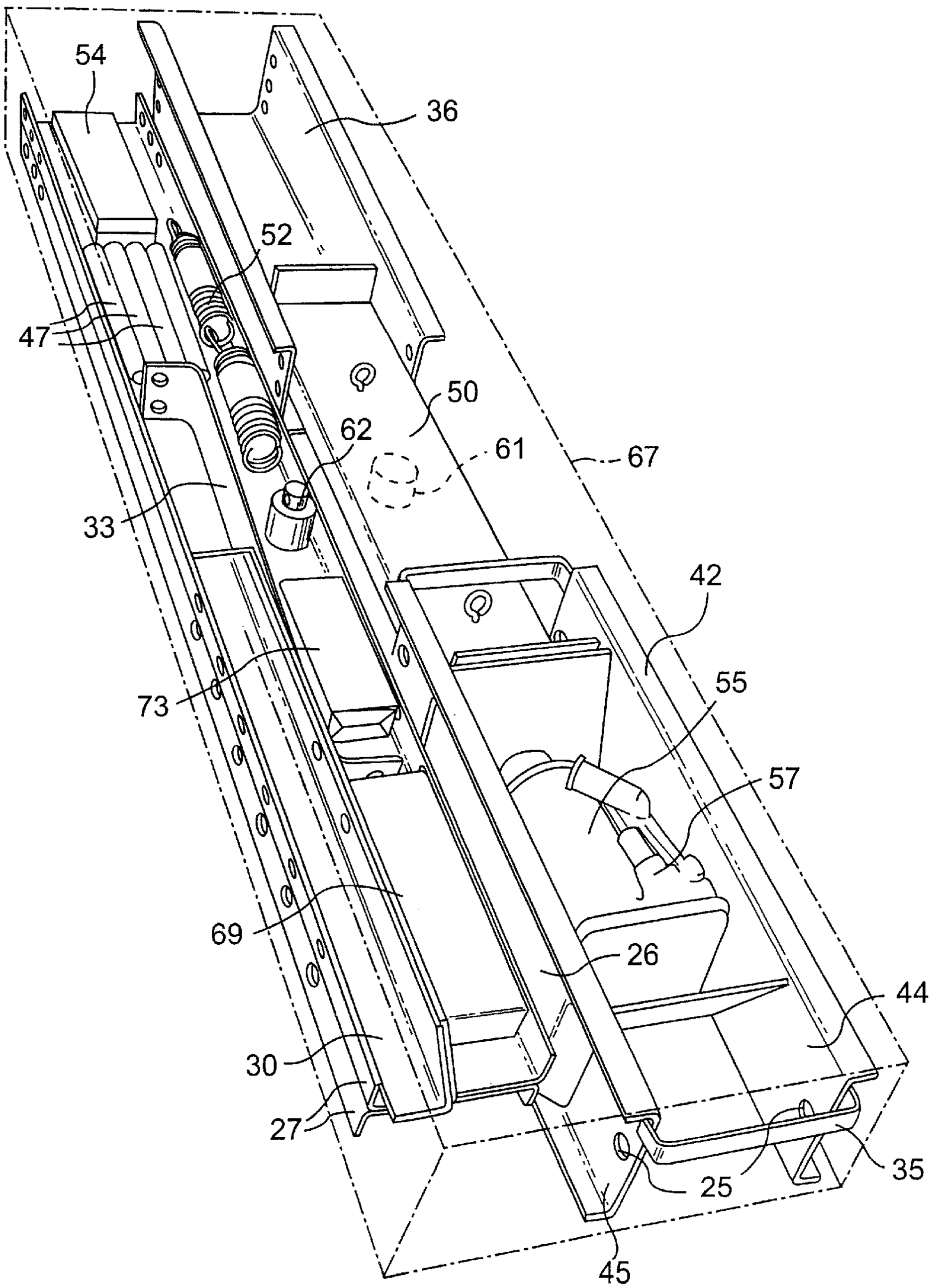

FIG. 7

HYDRAULIC PRESS

This application claims the benefit of Provisional application Ser. No. 60/200,422, filed Apr. 28, 2000.

BACKGROUND OF THE INVENTION

Hydraulic presses rated for pressures up to 55 tons have been known. As shown in FIG. **1**, these conventional presses include a pair of legs **11**, **12** mounted on a pair of feet **13**, **14** connected at the bottom by a cross brace **15**. At the top of the legs, a head piece **16** is permanently connected (as by welding) to the two legs and provides the resistance for the hydraulic press. A bed **17** extends transversely across the legs and is positioned about midway between the head **16** and the feet **13**, **14** and is carried by pins **18** that engage both the bed **17** and the legs **11**, **12** at the opposite ends of the bed. The bed **17** carries the work piece to which the pressure is to be applied by the press. The bed **17** typically is reinforced at each opposite end of the bed **17** by a diagonally disposed spacer plate **19**.

In a conventional press shown in FIG. **1** for example, each of the legs **11**, **12**, head piece **16**, and bed **17** is formed of channel steel. The head **16** is formed by two lengths of channel steel **20** wherein each one is welded at each of its opposite ends to the upper end of each of the legs **11**, **12**. One length **20** is welded in the front of the press, and the other length **20** is welded in the back. Similarly, the bed **17** is formed by two lengths of channel steel **21** opposed to one another and joined at their opposite ends by welding the spacer plates **19** between them.

The gauge of the steel that is used depends upon the pressure rating of the press. For example, a conventional press rated at 55 tons typically would use 5 gauge channel steel for the legs **11**,**12**, the lengths **21** forming the bed **17** and the lengths **20** forming the head **16**. Conventional presses rated at 20 to 30 tons typically would use 9 gauge channel steel for the legs **11**,**12**, the lengths **20** forming the head **16**, and the lengths **21** forming the bed **17**.

As shown in FIG. **1** for example, some conventional press designs have a carriage **22** that carries a hydraulic powered ram **24**. As is conventional, the carriage **22** can be provided with one or more pairs of telescoping tubes **23** that guide the vertical movement of the carriage **22**. In other designs such as shown in U.S. Pat. No. 4,283,825, which is hereby incorporated herein by this reference, the carriage **60** is guided by a pair of guide sleeves **63**, **65**, one being disposed at each opposite end of the carriage **60** and surrounding each leg.

The cost of shipping these conventional presses from the manufacturer to the customer depends on the volume occupied by the shipping carton and the weight of the press. Because the head **16** is welded to the legs and defines the overall width of the conventional press, the size of the shipping carton cannot be smaller than the width of the press. A conventional 55 ton press usually must be carried on a separate wooden pallet for each press. A shipping pallet holds about four conventional 30 ton presses or 20 ton presses, and about six conventional 12 ton presses usually can be shipped on a pallet. The shipping weight for a typical conventional press rated at 55 tons is about 480 pounds. Similarly, the shipping weights for a conventional 30 ton press is about 235 pounds, and 220 pounds for a conventional 20 ton press. A conventional 12 ton press has a shipping weight of about 80 pounds.

OBJECTS AND SUMMARY OF THE INVENTION

It is a principal object of the present invention to provide an hydraulic press that is lighter than conventional presses with the same pressure rating.

It is also a principal object of the present invention to provide an hydraulic press that has a more compact shipping volume than conventional presses with the same pressure rating.

It is a further principal object of the present invention to provide an hydraulic press that is less expensive to manufacture than conventional presses with the same pressure rating.

Additional objects and advantages of the invention will be set forth in part in the description which follows, and in part will be obvious from the description, or may be learned by practice of the invention. The objects and advantages of the invention may be realized and attained by means of the instrumentalities and combinations particularly pointed out in the appended claims.

To achieve the objects and in accordance with the purpose of the invention, as embodied and broadly described herein, an hydraulic press includes a pair of spaced apart, vertically extending legs, a head member having each one of its opposite ends connected to the top end of one of the legs, a hydraulic cylinder having one end connected to the head, and a bed disposed transversely between the two legs and configured so that the operator can selectively slide the bed vertically along the length of the legs.

Each leg is formed of a length of C-channel steel in which the tab portions are drilled with spaced apart aligned holes along the lower half of each leg. A foot member is removably connected to the bottom end of each leg, and a cross-brace is removably connected to each foot member.

The head member has a transverse cross-sectional shape resembling the letter U and defines a base section and a pair of opposed side sections. Each side section is configured and disposed to extend at a right angle from the base section. The upper portion of each side section further defines a lip that is disposed in a plane that is parallel to the plane of the base section and perpendicular to the plane of each side section. The head member is desirably formed as a unitary sheet of steel that is rolled into the generally U-shaped transverse cross-sectional configuration with the lips on the upper portions of the side sections. Each end of the head member is removably attached to the upper portion of one of the legs. This typically is accomplished by one or more threaded bolts and threaded nuts extending transversely through pre-drilled holes that are aligned in the upper portions of the legs and the ends of the head member. A reinforcement channel is disposed to extend transversely on the interior surface of the base section of the head member and has its ends welded to the interior surfaces of the side sections.

The bed member includes a pair of lengths of C-channel steel that are disposed in opposition to one another to form a front panel and a back panel. The upper and lower tabs of the C-channel are disposed to face away from the tabs on the opposed length of C-channel. These panels are permanently connected by a pair of spacer plates disposed symmetrically between the mid-portions of the front and back panels. A front breast plate is permanently attached to the front panel of the bed. A rear plate is permanently attached to the back panel of the bed. At the opposite ends of the front and back panels of the bed, at least one pair of aligned holes is configured to receive a press pin therein. When the bed is mounted on the press, a press pin is received within each pair of aligned holes defined in each end of the front and back panels of the bed and extending through a pair of aligned corresponding holes defined in the tab portions of each leg. A handle is permanently attached to each end of the bed.

In an alternative embodiment of the press, a carriage member is disposed slidably between the opposed legs and

oriented between the bed member and the head member. A pair of springs connects and biases the carriage to the head member. A means of guiding the carriage in vertical travel between the head member and the bed can also be provided and can take any of a number of forms that are conventional in the art.

The press of the present invention can be completely disassembled for packing in a shipping carton. Since the head is removably attached to the legs by one or more bolts at each end of the head section and upper portion of the legs, the width of the shipping carton is not defined by the width of the assembled press of the present invention. The disassembled press of the present invention occupies a much smaller volume than a fully assembled conventional press. Moreover, the gauge of steel that is required for the components of the press of the present invention is lighter than the gauge of steel that is used in a comparably rated conventional press. Accordingly, the press of the present invention is lighter in weight and occupies less shipping space than a comparably rated conventional press. Additionally, the use of bolts to connect the head member to the legs means that the press of the present invention is easier and less costly to build than a comparably rated conventional press.

The accompanying drawings, which are incorporated in and constitute a part of this specification, illustrate one embodiment of the invention and, together with the description, serve to explain the principles of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is an elevated perspective view of a conventional press;

FIG. **2** is an elevated perspective view of a hydraulic press according to a presently preferred embodiment of the invention;

FIG. **3** is a view of components of the press taken in cross-section along the lines **3**—**3** in FIG. **2**;

FIG. **4** is a partially cut away perspective view of a portion of the press shown in FIG. **2**;

FIG. **5** is an elevated perspective view of an alternative presently preferred embodiment of the invention;

FIG. **6** is a partially cut away perspective view of a portion of the press shown in FIG. **5**; and

FIG. **7** is an elevated perspective view of a presently preferred embodiment of the press in its disassembled form and organized in a manner that fits into a shipping carton (indicated by chain dashed lines).

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Reference now will be made in detail to the presently preferred embodiments of the invention, one or more examples of which are illustrated in the accompanying drawings. Each example is provided by way of explanation of the invention, not limitation of the invention. In fact, it will be apparent to those skilled in the art that various modifications and variations can be made in the present invention without departing from the scope or spirit of the invention. For instance, features illustrated or described as part of one embodiment, can be used on another embodiment to yield a still further embodiment. Thus, it is intended that the present invention cover such modifications and variations as come within the scope of the appended claims and their equivalents. The same numerals are assigned to the same components throughout the drawings and description.

An hydraulic press configured in accordance with the present invention includes a pair of vertically extending legs that are disposed spaced apart from each other, and each leg has a top end and a bottom end. As embodied herein and shown in FIGS. **2** and **5** for example, each leg **27** is formed by a length of C-channel steel. As shown in FIG. **4** for example, each leg **27** has a flat mid portion **28** and a pair of tabs **29** extending from the top and bottom edges and unitary with the mid portion **28**. The tabs **29** are disposed at a right angle with respect to the mid-portion **28**. The tabs **29** of each leg **27** cooperate with the mid portion **28** to form and define three sides of a channel along the length of each leg. Each leg **27** is desirably disposed with the channel formed by the tabs **29** facing the channel of the opposed leg in the pair. Thus, the tabs **29** of each leg **27** point towards the tabs **29** of the opposed leg **27**.

As shown in FIGS. **2** and **5** for example, a foot member **30** is removably connected to the lower end of each leg **27** as by being bolted thereto so as to extend at a right angle to the length of each leg. Each foot member **30** desirably is formed as a length of right angle steel that defines a pair of flanges **31**, **32** joined at a right angle as a unitary length of steel. One of the flanges **31** is removably attached to one leg **27** of the press. As shown in FIGS. **2** and **5** for example, each end of a cross-brace **33** is removably connected to one of the foot members **30**.

As shown in FIG. **2** for example, the foot member **30** can desirably be disposed so that the second flange **32**, which is the one that contacts the floor, faces toward the center of the press. However, as shown in FIG. **5** for example, the foot member **30** can be disposed and attached to the leg **27** of the press so that the second flange **32** of the foot member **27** points away from the center of the press, if desired. This second orientation provides a wider footprint and arguably more stability to the press. At some locations, however, the wider footprint is undesirable, and unnecessary in view of the adequate stability of the press with the second leg **32** disposed toward the center of the press.

As shown in FIGS. **2** and **5** for example, each leg **27** has a plurality of holes **34** extending transversely therethrough and disposed along the length of the tabs **29** in the lower portion of the leg. The holes **34** are spaced apart and bored transversely with respect to the length of each leg. The holes **34** defined by one tab **29** of a leg **27** are aligned with holes **34** defined by the opposite tab **29** of the leg. Moreover, each hole **34** defined by each leg **27** is bored so as to correspond to a hole **34** defined by the opposite leg at the same distance from the end of the leg. Thus, when the legs **27** are connected to form the press, the aligned holes **34** of one leg **27** will be disposed at the same vertical height as the aligned holes **34** of the opposite leg **27**.

The press includes a head member that is removably connected at each opposite end to one of the legs. As shown in FIGS. **2**, **3**, **5** and **7** for example, the press includes a head member **36** that is formed of a unitary plate of metal that is bent (as by being rolled) to form a U-shaped transverse cross-section. The head member **36** has a base **37** that is connected to each of a pair of opposed side portions **38** by a rolled portion of the plate such that the base **37** of the head member **36** extends in a plane that is perpendicular to the plane in which each of the side portions **38** extends. Moreover, the upper portion of each side portion **38** is also rolled to form a lip member **39** that is disposed in a plane that is parallel to the plane of the base **37** and perpendicular to the plane of the side portions **38**.

As shown in FIG. **3** for example, head member **36** is configured so that its opposite ends fit within the opposed

channels formed by the legs **27**, and the transverse width of the head member **36** is desirably configured to fit snugly within the channel formed by each leg **27**. Accordingly, the head **36** can be inserted from the upper end of each leg **27** into the channels formed by the legs **27**. The lip members **39** of each side portion **38** of the head **36** prevent the head member **36** from sliding past the upper free edge of each leg **27** toward the foot members **30** and are also believed to add strength to the head member **36**.

As shown in FIGS. **2** (dashed line) and **3** for example, a reinforcing tube **40** can be connected to the base section **37** of head member **36**. Desirably, this connection is permanent and can be accomplished by welding. As shown in FIG. **3** for example, reinforcing tube **40** extends transversely across head member **36** and is attached to the side portions **38** of head member **36**.

As shown in FIGS. **2**, **3** and **5** for example, the opposite ends of the head member **36** are removably secured to the legs **27**. The opposite ends of the head **36** are drilled with one or more holes. The upper end of each leg **27** is drilled with one or more holes sized and spaced to correspond and align with the holes drilled through the ends of head member **36**. The opposite ends of the head **36** are removably attached to the upper ends of the legs **27** by being bolted to the upper ends of the legs. Desirably ½" diameter grade 5 plated steel bolts are used for this purpose, and about two bolts at each end, front and back, are sufficient for a press rated for twelve tons. In the embodiments shown in FIGS. **2**, **3** and **5** for example, three bolts **41** and corresponding nuts connect each end of each side of the head member **36** to the upper portion of one of the tab portions **29** of each leg **27** for presses rated at twenty tons and higher.

It is believed that the configuration of the head member **36** with the rolled lips **39**, the reinforcing tube **40** and attachment to the legs **27** by bolts **41** rather than welding results in a stronger head member **36** and permits the press to operate at greater loads than conventional presses with thinner gauge steel in the head member than conventional presses of comparable pressure capacity.

The press of the present invention includes a bed that is supported by the legs and disposed beneath the head member. The bed extends parallel to the head member and transversely with respect to the length of the legs and provides the support for the work piece that is to be subjected to the pressure applied by the press.

As embodied herein and shown in FIGS. **2**, **4** and **5** for example, the bed **42** is desirably formed by two lengths of steel C-channel arranged in opposition to one another with the channel portions facing away from one another. Thus, as shown in FIG. **4** for example, the tabs **43***a*, **43***b* of one of the lengths of C-channel are disposed to face away from the tabs **43***a*, **43***b* on the opposed length of C-channel. One length of C-channel forms a front panel **44** of the bed **42**, and the opposed length of C-channel forms the rear panel **45** of the bed **42**.

The bed is reinforced at its mid portion by a pair of diagonally disposed spacer plates in the interior of the bed. As embodied herein and shown in FIGS. **2**, **4** and **5** for example, the bed **42** is provided with a pair of symmetrically placed spacer plates **46** that extend between the interior surfaces of the front panel **44** and rear panel **45** of the bed **42**. These spacer plates **46** are disposed in the mid-portion of the bed **42** and extend at an angle (typically 45 degrees) from the horizontal as the bed is positioned between the legs **27**. Thus, the front and rear panels of the bed **42** are joined permanently (as by welding) at their mid portions by the spacer plates **46** between them. Disposing the spacer plates **46** near the mid portion of the bed **42** rather than towards the ends of the bed, is believed to allow the bed to be constructed of thinner gauge steel than conventional presses of comparable pressure rating. As shown in FIG. **4** for example, a handle **35** can be permanently attached (as by welding) to each end of the bed.

As noted above and shown in FIGS. **2**, **4** and **6** for example, each hole **34** in the lower half of each leg **27** is configured to receive therein a steel pin **47** that can extend sufficiently out of each hole so as to provide a resting place for the bottom surface of the bed **42**, which is held at a particular height above the floor by the pins **47**. As shown in FIGS. **4** and **6** for example, the bottom surfaces of tabs **43***b* define the bottom surface of bed **42** that is carried by pins **47**, which are in turn carried by the legs **27** via the holes **34** through the tabs **29** of the legs **27**.

However, the press of the present invention is configured to provide additional support and an additional margin of safety against failure during operation of the press. As embodied herein and shown in FIGS. **5**, **6** and **7** for example, at least one additional hole **25** is provided and bored transversely through each end of the front and rear panels **44**, **45** of bed **42** and positioned so as to correspond to and align with the holes **34** in each leg **27**. Accordingly, as shown in FIGS. **2** and **4** for example, up to two additional pins **47** can be disposed transversely through the holes on each end of the bed **42** and through the corresponding holes **34** in the corresponding leg **27** at each end of the bed. These additional pins **47** provide additional support and an additional margin of safety against failure of any one pin disposed beneath bed **42** during operation of the press.

The bed is reinforced at its mid portion at the exterior of the bed by a breast plate permanently attached to the exterior of the front panel and a back plate permanently attached to the exterior of the rear panel of the bed. As embodied herein and shown in FIGS. **2**, **4**, **5** and **6** for example, the bed **42** can be provided with a breast plate **48** that is permanently attached (as by welding) in the vicinity of the mid-portion of the bed to the front of the front panel **44** of the bed. As shown in FIGS. **4** and **6** for example, one lateral edge of the breast plate **48** is disposed to extend from and connect to the free edge of upper tab **43***a* and the other lateral edge of the breast plate **48** is disposed to extend from and connect to the free edge of lower tab **43***b* of the front panel **44** of the bed **42**. As shown in FIGS. **4** and **6** for example, the ends of the breast plate **48** are permanently attached to the front panel **44**.

A back plate **26** (FIG. **7** only) is similarly connected to the rear panel **45** of the bed **42** and oriented symmetrically about the mid-portion of the rear panel **45** to coincide with the location of the breast plate **48**. Each lateral edge of the back plate is also disposed to extend from and connect to one of the free edge of the upper tab and the free edge of the lower tab of the rear panel **45** of the bed **42**. The ends of the back plate **26** are permanently attached to the rear panel **45**. As shown in FIG. **4** for example, the breast plate **48** and the back plate are configured with a pair of bends **49** that trisect the plates and configure the plates in the shape of three sides of a trapezoid. It is believed that the configuration of the breast plate **48** and the back plate strengthens the bed **42** and permits the press to operate at greater loads with thinner gauge steel in the legs **27** and bed **42** than conventional presses of comparable pressure capacity.

For a 55 ton-rated press configured according to the present invention, the head member **36** is formed of 7 gauge steel rather than the 5 gauge steel that is required for the head

of a conventional press rated at 55 tons. The legs **27** of a 55 ton-rated press configured according to the present invention are formed from 7 gauge steel rather than the 5 gauge steel that is required on a conventional press that is rated for 55 tons. The front and rear panels **44**, **45** of the bed **42** and the breast plate **48** and the back plate **26** of a 55 ton-rated press configured according to the present invention are also formed of 7 gauge steel rather than the 5 gauge steel that is required on the bed of a conventional 55 ton press. Similarly, in a 30-ton or 20-ton press according to the present invention, 9 gauge steel is used for the above-listed components instead of the 7 gauge steel that is used for the same components in a conventional 30-ton or 20-ton press for example. Additionally, in a 12-ton press according to the present invention, 11 gauge steel is used for the above-listed components instead of the 9 gauge steel that is used for the same components in a conventional 12-ton press for example.

As shown in FIGS. **5**, **6** and **7** for example, in one alternative embodiment of the press of the present invention, a carriage member **50** is provided. Carriage member **50** is configured and disposed to be vertically moveable between the legs **27**. As shown in FIG. **6** for example, a guide member in the form of a slide plate **51** is disposed at a right angle at each opposite end of the carriage **50** and configured to fit slidably within the channel formed by each leg **27**. The slide plates **51** at the opposite ends of the carriage **50** function to prevent tilting of the carriage **50** that might position the carriage **50** at an orientation other than perpendicular with respect to the legs **27** and parallel with respect to the head member **36** and bed **42**. As is conventional in the art, alternative types of guide members can be provided in the form of a pair of telescoping tubes wherein one end of one tube is connected to the head member **36** and one end of the other tube is connected to the carriage member **50**. Desirably a second guide element in the form of two additional telescoping tubes are connected between the head **36** and the carriage member **50** and disposed symmetrically with respect to the first guide element.

As is conventional, an hydraulic cylinder is provided to supply the force needed to operate the press. The hydraulic cylinder is disposed so as to apply pressure to the head member and the bed during operation of the press. The hydraulic cylinder can have one end disposed in contact with the head member by being attached to the head member or resting against a pressure plate that presses against the head member. In the latter case, the base of the hydraulic cylinder can rest on a carriage that is slidably disposed between the head member and the bed.

As embodied herein and shown in FIGS. **2** and **5** for example, the hydraulic cylinder **55** can be provided in the form of a hydraulic jack that has a pump **57** operated by a manual actuating handle **58** and a release valve that is operated by a spigot **72** (FIG. **6**). As shown in FIG. **2** for example, the hydraulic cylinder **55** can be connected to the head member **36** and configured and disposed to position the ram **56** to operate directly on a work piece that is carried by the bed **42**. As shown in FIG. **3** for example, shouldered bolts **64** can be passed through holes in the base **37** of head member **36** and screwed into tapped holes **66** (outlined in dashed line) provided in the base plate **68** of the hydraulic cylinder **55**. Alternatively, as shown in FIG. **5** for example, the hydraulic cylinder **55** can be disposed between the head member **36** and the carriage member **50** so that the ram **56** is disposed in contact with a pressure plate **69** that rests against the head member **36**, and the base plate **68** of the cylinder **55** rests against carriage member **50**.

As is conventional, a mechanism for biasing the ram **56** of the cylinder **55** towards the head member can be provided. As shown in FIG. **2** for example, this can be accomplished by a pair of springs **53** that have one end connected to the head member **36** and the other end connected to the ram **56** of the cylinder **55**. Similarly, in the embodiment shown in FIGS. **5** and **6** for example, a mechanism for biasing the carriage member **50** towards the head member can be provided. As shown in FIG. **5** for example, this can be accomplished by a pair of springs **52** connected between the head member **36** and the carriage member **50**. In each embodiment, the respective springs **52**, **53** act to force hydraulic fluid back into the reservoir so that the ram **56** can retract into the cylinder **55** when the cylinder=s pressure valve is opened.

A mechanism can be provided so that the press can be fitted with a tool element. As shown in FIG. **2** for example, the free end of the ram **56** can be configured to hold the tool element **62** in any conventional manner such as by a bolt **70** and pin **71**. In this way, the end of the ram **56** can be configured to hold a tool element **62** that is removably attachable to ram **56**. However, as shown in FIG. **6** for example, a chuck **61** or a collet **61** or another implement configured to hold a tool element **62** to depend downwardly therefrom or presented in a desired position for performing the desired work function, can be provided. The chuck **61** can be attached to the underside of the carriage as shown in FIG. **6**. Both arrangements of the hydraulic press are conventional and are not further described herein.

As shown in FIG. **2** for example, cylinder **55** can be configured with a second pump **59** that receives one end of the handle **58** in a manner that permits the user to apply pressure to the cylinder **55** in a manner that operates the ram **56** to extend at a greater rate than the conventional pump **57** of the cylinder **55**.

As shown in FIGS. **2** and **6**, a pair of flat bars **54** (depicted in dashed lines) can be provided to raise the height of the work piece and dispose it closer to the end of the working tool **62** of the press.

As shown in FIG. **7** for example, the press of the present invention disassembles for shipping in a carton **67** (indicated by the chain dashed lines). The legs **27** can be disposed lengthwise in the carton together with the foot members **30** likewise. The head member **36**, carriage **50** (if any), bed **42** and hydraulic cylinder **55** can be aligned in carton **67** alongside legs **27** and foot member **30**. Various other smaller components such as flat bars **54**, pins **47** cross brace **33**, tool element **62**, springs **52** and boxes **73** of the bolts and nuts used for assembly can be fitted into carton **67**.

The press of the present invention can be completely disassembled for packing in a shipping carton. Since the head **36** is removably attached to the legs **27** by one or more bolts **41** at each end of the head section and upper portions of the legs, the width and depth of the shipping carton is not defined by the width and depth of the assembled press of the present invention. The disassembled press of the present invention occupies a much smaller volume than a fully assembled conventional press of comparable pressure rating. Accordingly, a single shipping pallet should be able to hold four 55-ton presses according to the present invention versus only one conventional 55-ton press. A single shipping pallet should be able to hold fifteen 30-ton presses according to the present invention versus only four conventional 30-ton presses. A single shipping pallet should be able to hold fifteen 20-ton presses according to the present invention versus only four conventional 20-ton presses. A single

shipping pallet should be able to hold twenty 12-ton presses according to the present invention versus only six conventional 12-ton presses.

Moreover, the gauge of steel that is required for the components of the press of the present invention is lighter than the gauge of steel that is used in a conventional press that has a comparable pressure rating. Accordingly, the press of the present invention is lighter in weight and occupies less shipping space than a comparably rated conventional press. A 55-ton press according to the present invention weighs only about 380 pounds versus about 480 pounds for a conventional 55-ton press. A 30-ton press according to the present invention weighs only about 175 pounds versus about 235 pounds for a conventional 30-ton press. A 20-ton press according to the present invention weighs only about 145 pounds versus about 220 pounds for a conventional 20-ton press. A 12-ton press according to the present invention weighs only about 60 pounds versus about 80 pounds for a conventional 12-ton press.

Additionally, the use of bolts to connect the head member to the legs means that the press of the present invention is easier and less costly to build than a comparably rated conventional press.

While preferred embodiments of the invention have been described using specific terms, such description is for illustrative purposes only, and it is to be understood that changes and variations may be made without departing from the spirit or scope of the following claims.

What is claimed is:

1. A hydraulic press, comprising:

a pair of vertically extending legs, each leg having a top end and a bottom end, each leg being disposed spaced apart from the other leg;

a head defining a first end and a second end opposed to said first end, said first end being removably connected to the top end of one of said legs, said second end being removably connected to the top end of said other leg;

a bed disposed transversely between said two legs; and

a hydraulic cylinder disposed so as to apply pressure to said head member and said bed during operation of the press.

2. A hydraulic press, comprising:

a pair of vertically extending legs, each leg having a top end and a bottom end, each leg being disposed spaced apart from the other leg;

a head defining a first end and a second end opposed to said first end, said first end being removably connected to the top end of one of said legs, said second end being removably connected to the top end of said other leg;

a bed disposed transversely between said two legs;

a hydraulic cylinder disposed so as to apply pressure to said head member and said bed during operation of the press; and

wherein said head is formed as a unitary rolled sheet of steel configured in a generally U-shaped transverse cross-section and wherein each end of said head is removably connected to one of said legs by at least two nuts and bolts.

3. A hydraulic press, comprising:

a pair of vertically extending legs, each leg having a top end and a bottom end, each leg being disposed spaced apart from the other leg;

a head defining a first end and a second end opposed to said first end, said first end being removably connected to the top end of one of said legs, said second end being removably connected to the top end of said other leg;

a bed disposed transversely between said two legs;

a hydraulic cylinder disposed so as to apply pressure to said head member and said bed during operation of the press; and

wherein said head defines a base and a pair of opposed side portions, each said side portion being configured and disposed to extend from said base and having an upper portion, said upper portion of each side portion further defining a lip member that is disposed in a plane that is parallel to the plane of said base and perpendicular to the plane of said side portion.

4. A press as in claim **3**, further comprising:

a reinforcing tube permanently connected to said base section of said head.

5. A hydraulic press, comprising:

a pair of vertically extending legs, each leg having a top end and a bottom end, each leg being disposed spaced apart from the other leg;

a head defining a first end and a second end opposed to said first end, said first end being removably connected to the top end of one of said legs, said second end being removably connected to the top end of said other leg;

a bed disposed transversely between said two legs;

a hydraulic cylinder disposed so as to apply pressure to said head member and said bed during operation of the press; and

wherein said bed includes a front panel and a back panel opposed to said front panel and a pair of spacer plates disposed symmetrically about the mid-portion of said bed and connected between said panels of said bed.

6. A hydraulic press, comprising:

a pair of vertically extending legs, each leg having a top end and a bottom end, each leg being disposed spaced apart from the other leg;

a head defining a first end and a second end opposed to said first end, said first end being removably connected to the top end of one of said legs, said second end being removably connected to the top end of said other leg;

a bed disposed transversely between said two legs;

a hydraulic cylinder disposed so as to apply pressure to said head member and said bed during operation of the press; and

wherein said bed includes a front panel and a back panel opposed to said front panel and further comprises:

a breast plate permanently attached to said front panel of said bed; and

a rear plate permanently attached to said back panel of said bed.

7. A press as in claim **1**, wherein said bed includes a front panel and a back panel opposed to said front panel and each end of said front and back panels of said bed defines at least a first pair of aligned holes configured to receive a first press pin therein and defines a second pair of aligned holes configured to receive a second press pin therein.

8. A press as in claim **7**, wherein each said leg includes a first pair of aligned holes therethrough and the press further comprises:

a first press pin received within each first pair of aligned holes defined in each end of said front and back panels of said bed and extending through said first pair of aligned holes defined through each said leg.

9. A press as in claim **8**, further comprising:

at least a second pair of aligned holes defined through each end of said front and back panels of said bed and configured to receive a second press pin therein;

a second pair of aligned holes defined through each said leg and configured to receive a second press pin therein; and

a second press pin received within each second pair of aligned holes defined in each end of said front and back panels of said bed and extending through one of said second pairs of aligned holes defined through each said leg.

10. A hydraulic press, comprising:

a pair of vertically extending legs, each leg having a top end and a bottom end, each leg being disposed spaced apart from said other leg, and each said leg including at least one pair of aligned holes therethrough;

a head member defining a first end and a second end opposed to said first end, said first end of said head member being removably connected to said top end of one of said legs by at least two nuts and bolts, said second end of said head member being removably connected to said top end of said other leg by at least two nuts and bolts, said head member being formed as a unitary rolled sheet of steel configured in a generally U-shaped transverse cross-section and wherein said head member defines a base and a pair of opposed side portions, each said side portion being configured and disposed to extend from said base and having an upper portion, said upper portion of each said side portion further defining a lip member that is disposed in a plane that is parallel to the plane of said base;

a reinforcing channel permanently connected to said base of said head member and extending between said opposed side portions of said head member and having a first end connected to one of said opposed side portions of said head member and having a second end disposed opposite said first end and connected to the other of said opposed side portions of said head member;

a bed disposed transversely between said two legs wherein said bed includes a front panel and a back panel opposed to said front panel and a pair of spacer plates disposed symmetrically about the mid-portion of said bed and connected between said panels of said bed, each of said front panel and back panel includes a first end and a second end disposed opposite said first end, and each end of said front and back panels of said bed defines at least one pair of aligned holes configured to receive a press pin therein;

a breast plate permanently attached to said front panel of said bed;

a rear plate permanently attached to said back panel of said bed;

a press pin received within each pair of aligned holes defined in each end of said front and back panels of said bed and extending through one of said pairs of aligned holes defined through each said leg; and

a hydraulic cylinder disposed between said head member and said bed so to provide the pressing force of the press.

11. A press as in claim **10**, further comprising:

a first foot member removably connected to said bottom end of one of said legs, and a second foot member removably connected to said bottom end of a second one of said legs, each said foot member being configured as an elongated length of right angle steel defining a pair of flanges joined at a right angle, wherein one of said flanges is disposed to rest against one of said legs and the other of said flanges is disposed to rest against a surface that is supporting the weight of the press.

12. A press as in claim **10**, further comprising:

at least a second pair of aligned holes defined through each end of said front and back panels of said bed and configured to receive a press pin therein;

a second pair of aligned holes defined through each said leg and configured to receive a press pin therein: and

a press pin received within each said second pair of aligned holes defined in each end of said front and back panels of said bed and extending through one of said second pairs of aligned holes defined through each said leg.

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